CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 85-134

WASTE DISCHARGE REQUIREMENTS FOR:

LAWRENCE LIVERMORE NATIONAL LABORATORY
LIVERMORE
ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

1. Lawrence Livermore National Laboratory (hereinafter called the discharger) occupies 640 acres of land in the Livermore Valley, Alameda County. The site is located in the eastern region of the Valley known as the Mocho I subbasin (Attachment 1). This facility was first used in the 1940s by the U. S. Navy as a Naval Air Station and subsequently, it has served as a federal research facility. From the beginning of its use by the federal government, hazardous materials have been used, stored, and disposed of on the property. Solvents and chemicals used on-site, either currently or historically, which have been found in the groundwater on-site and off-site, include trichloroethylene (TCE), 1,1,1 trichloroethane (TCA), tetrachloroethylene (PCE) and other halogenated hydrocarbons.

2. A common means of disposing of hazardous waste in the past was by burying it in landfills on the discharger's property. There are two known landfills on the facility where solvents and other chemicals are known to have been disposed. (Attachment 2).

3. Other suspected sources of releases of chemicals include spillage from outdoor storage facilities that existed throughout the facility and from underground tanks and pipelines. Chemical handling and storage facilities have recently been upgraded to provide spill containment.

4. In April 1983, the discharger drilled several wells on its property. Some wells showed contaminants (e.g. TCE and PCE) to be present in the groundwater. In December 1983, private wells immediately downgradient of the discharger were sampled and found to be polluted with the same chemicals.

5. Subsequent work was done with soil borings drilled on the discharger's property to better define the sources of the contamination. Various locations showed soil contamination.

6. A second phase of work was begun in January 1985 with the primary purpose of defining the vertical and lateral offsite extent of the groundwater pollution as well as providing better definition of the onsite hydrogeology.

7. A total of 67 monitoring wells have been drilled to date. The groundwater pollution has not yet been delineated and no cleanup or containment has begun.

8. Work completed so far has shown that there is more than one point of discharge of hazardous materials into the underlying groundwater at the discharger's facility. These include a gasoline spill from a underground tank, pollution in the area of the old landfills with the main contaminant being TCE, contamination in the southeast corner with TCA, and pollution in the southwest corner primarily with PCE.

9. The hydrogeology of the area has proven to be very heterogeneous. Special sampling techniques have been used in the drilling of boreholes to determine which water-bearing zones warrant monitoring wells. The groundwater appears to flow due west except in the southeastern corner where there exists a localized depression in the water table toward which groundwater flows.

10. Existing private wells in the Mocho I province are used for irrigation and domestic supply. In the Mocho II province which begins approximately one and one-half miles west of the discharger's facility, the California Water Service operates several municipal wells.

11. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on July 21, 1982. The Basin Plan contains water quality objectives for non tidal waters, Arroyo Mocho, etc. and Livermore/ Amador Valley groundwaters.

13. The existing and/or potential beneficial uses of the groundwater underlying and in the vicinity of the discharger include:

    a. municipal supply
    b. industrial supply
    c. industrial service supply
    d. agricultural supply

14. The existing beneficial uses of the surface waters (Arroyo Seco, Arroyo Los Positas, Arroyo Mocho and Arroyo de la Laguna) include:

    a. contact and non-contact water recreation
    b. wildlife habitat
    c. groundwater recharge
    d. fish migration and spawning

15. The Board has notified all interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge.

16. The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

17. The project constitutes a minor modification to land and such activity is thereby exempt from the provisions of the California Environmental Quality Act (CEQA) in accordance with Section 15304, Title 14, of the California Administrative Code.

IT IS HEREBY ORDERED, that the discharger, in order to meet the provisions contained in Division Seven of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge or disposal of wastes or hazardous materials in a manner which will degrade the water quality or adversely affect the beneficial uses of the groundwaters of the State is prohibited.

2. The discharge of wastes or hazardous materials through surface runoff or through subsurface transport which will degrade the water quality and adversely affect the beneficial uses of the surface waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of the pollution is prohibited.

4. The cleanup and containment of polluted groundwater by the discharger shall not adversely spread any pollution originating from other sites.

B. SPECIFICATIONS

1. The location of all potential sources of hazardous material discharges on the discharger's facility shall be identified and their contribution to the onsite soil and groundwater pollution shall be assessed and defined.

2. The lateral and vertical extent of the offsite and onsite groundwater pollution shall be assessed and defined.

3. The local and regional hydrogeologic conditions shall be defined in the areas of and contiguous to identified pollution.

4. Cleanup alternatives will be developed, evaluated, and implemented.

5. The potential for private wells in the area of the pollution to act as conduits for the spread of the pollution shall be identified. Wells identified as actual or potential conduits shall be properly sealed or abandoned, to the extent legally possible.

C. PROVISIONS

1. The storage, handling, treatment or disposal of polluted soil or groundwater shall not create a nuisance as defined in section 13050 (m) of the California Water Code.

2. In order to comply with Specification 1, the discharger shall meet the following compliance time schedule:

TASKS	COMPLETION DATE
a. Submit a workplan and time schedule to determine the integrity of all underground tanks containing hazardous materials, including gasoline, diesel fuel and rinse tanks.	December 1, 1985
b. Submit a technical report transmitting the results of the investigation described above.	July 1, 1986

3. In order to comply with Specifications 1, 2, and 4, the discharger shall complete the tasks listed in Table 1 and submit topical reports for the task dealing with developing and selecting cleanup alternatives and brief letter reports for the other tasks according to the time schedule given for each area of investigation.

PROVISION 3 SCHEDULE OF TASKS AND COMPLIANCE DATES
TABLE 1

REPORTS DOCUMENTING COMPLIANCE WITH TASKS WILL BE SUBMITTED BY DATES SHOWN

TASKS	Determine whether release has occurred at all suspected sources within area.	Determine lateral and vertical extent of contamination in soil and groundwater from all confirmed sources.	Develop and evaluate cleanup alternatives. Select a cleanup alternative acceptable to the Executive Officer.	Complete construction and implement the approved cleanup alternative.
ONSITE AREAS				
1. SW CORNER	May 1, 1987	November 1, 1987	February 1, 1988	August 1, 1988
2. B. 403 (gasoline leak)	Not applicable	July 1, 1986	December 1, 1986	May 1, 1987
3. S.E. CORNER	July 1, 1986	December 1, 1986	February 1, 1987	August 1, 1987
4. SOUTH CENTRAL				
TAXI STRIP/OSY	March 1, 1987	September 1, 1987	December 1, 1987	June 1, 1988
E. TRAFFIC CIRCLE	March 1, 1987	September 1, 1987	December 1, 1987	June 1, 1988
5. REMAINDER OF SITE	June 1, 1987	December 1, 1987	March 1, 1988	September 1, 1988
OFFSITE AREAS				
WITHIN AREA 1* (includes pollution associated with SW Corner and well 11A1)	Not applicable	July 1, 1986	December 1, 1986	May 1, 1987
OUTSIDE AREA 1	If pollution is found to extend beyond Area 1, a workplan to fully define its extent will be submitted by August 1, 1986.			

*Area 1 is defined as the region south of Hwy. 580, north of East Ave., west of the western border of the developed area of the laboratory property, and east of the boundary between the Mocho I and Mocho II groundwater provinces.

4. In order to comply with Specification B.3, the discharger to the extent responsible, shall:

   a. Determine the hydraulic characteristics of all water-bearing zones found to have pollution by using appropriate test methods.

   b. Determine the existing and potential migration of polluted groundwater from one water-bearing zone to another.

   c. Determine the recharge and discharge areas of the contaminated area and how these factors affect contaminant migration on a long-term and short-term basis.

   d. Determine the directions and velocities of groundwater flow in each of the water-bearing zones where pollutants are found.

   e. Assess the influence, if any, that pumping from private or public wells may have on the groundwater flow and pollutant migration.

   f. Submit a technical report summarizing the results of the investigation described in Provisions 4.a-e when submitting cleanup alternatives for each area.

5. In order to comply with Specification B.5, the discharger shall meet the following compliance time schedule:

TASK	COMPLETION DATE
a. Identify private wells, to the extent feasible, in the vicinity of the site and contaminated area with potential to act as conduits for inter-aquifer cross-contamination.	August 20, 1986
b. Locate and collect additional information on private wells identified in Provision 5.a. to assess if the wells may be potential conduits for interaquifer cross-contamination.	August 20, 1986

c. Develop a program to respond to any potential conduits and submit a technical report with options for addressing closure. — August 20, 1986

6. Documentation of compliance with the Specifications and Provisions in this order shall include groundwater gradient contour maps, concentration contour maps, cross-sectional geologic maps, geophysical and lithologic logs and laboratory analyses. The spacing of the monitoring wells and/or borings shall be sufficiently close to reduce errors in interpretation between data points. This documentation shall be updated and submitted with each technical report required under this Order, as appropriate.

7. The discharger shall submit monthly summaries on its progress toward compliance with the Provisions specified in this Order, including specific actions 8 taken and actions proposed prior to the next report. The monthly summary should be received in written form by the Regional Board staff by the tenth working day of each month.

8. The discharger shall report to the Board, annually, with the first report due on December 1, 1986, on the effectiveness of the groundwater containment cleanup program. The report shall discuss the treatment and disposal of any extracted groundwater, the status of the containment plume and the expected results of future extractions.

9. Results from the quarterly sampling of monitoring wells and private wells shall be submitted no later than the 15th day of the following months: February, May, August and November.

10. All samples shall be analyzed by State certified laboratories using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review.

11. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

    a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept.

    b. Access to copy any records required to be kept under terms and conditions of this Order.

    c. Inspection of any monitoring equipment or methods required by this Order.

    d. Sampling of any groundwater or soil which is accessible, or may become accessible as part of any investigation or remedial action program, to the discharger.

12. The discharger shall maintain in good working order and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

13. The Board will review this Order periodically and may revise the requirements when necessary. Interim and final cleanup limits shall be established by Board action once compliance with Specifications is achieved.

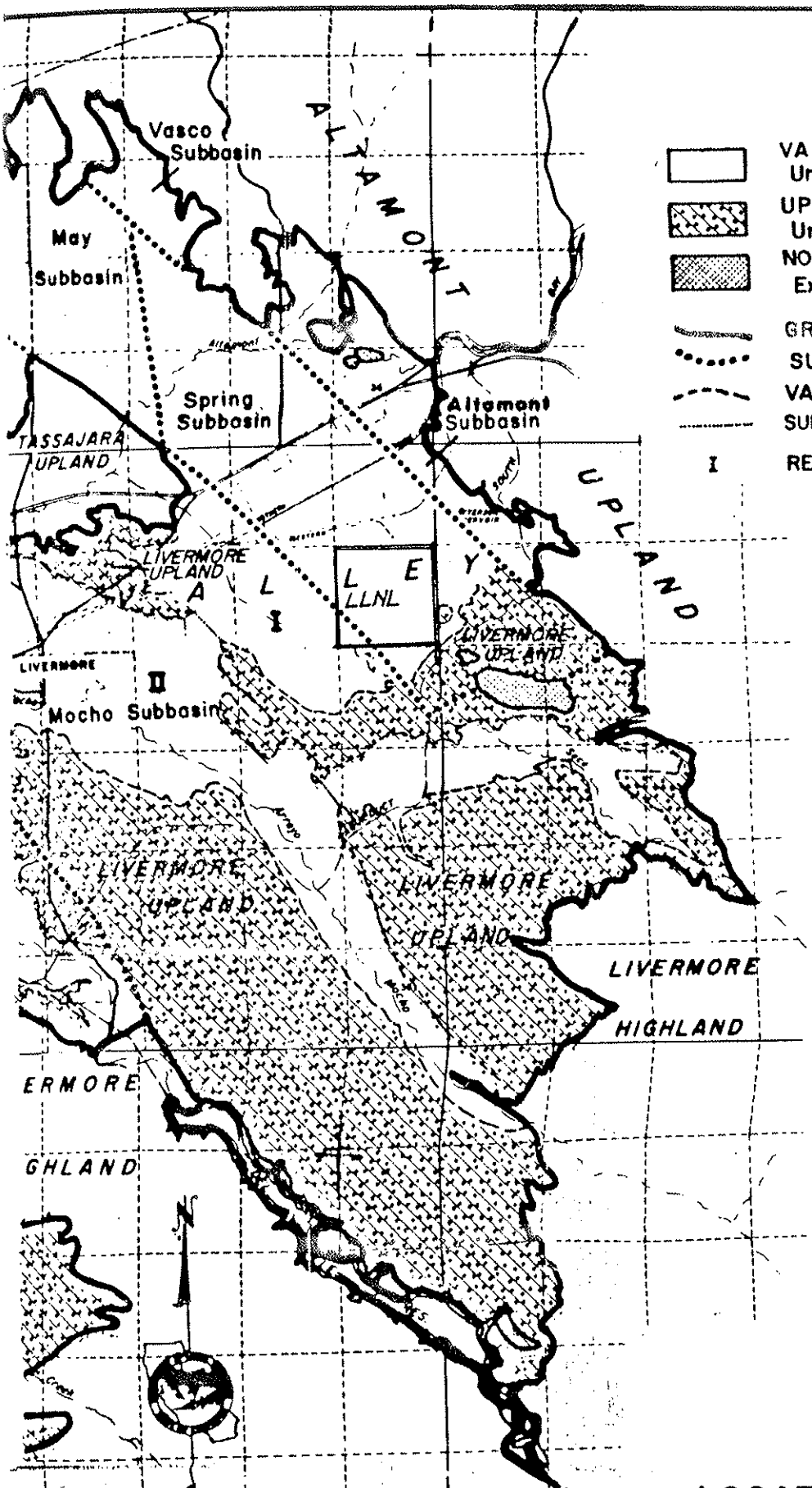
I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 20, 1985.

ROGER B. JAMES
Executive Officer

Attachments:

1. Location of Subbasins
2. Piezometric Surface Map
3. Locations of Hazardous Waste Releases and Areas of Suspected Contamination

ATTACHMENT 1

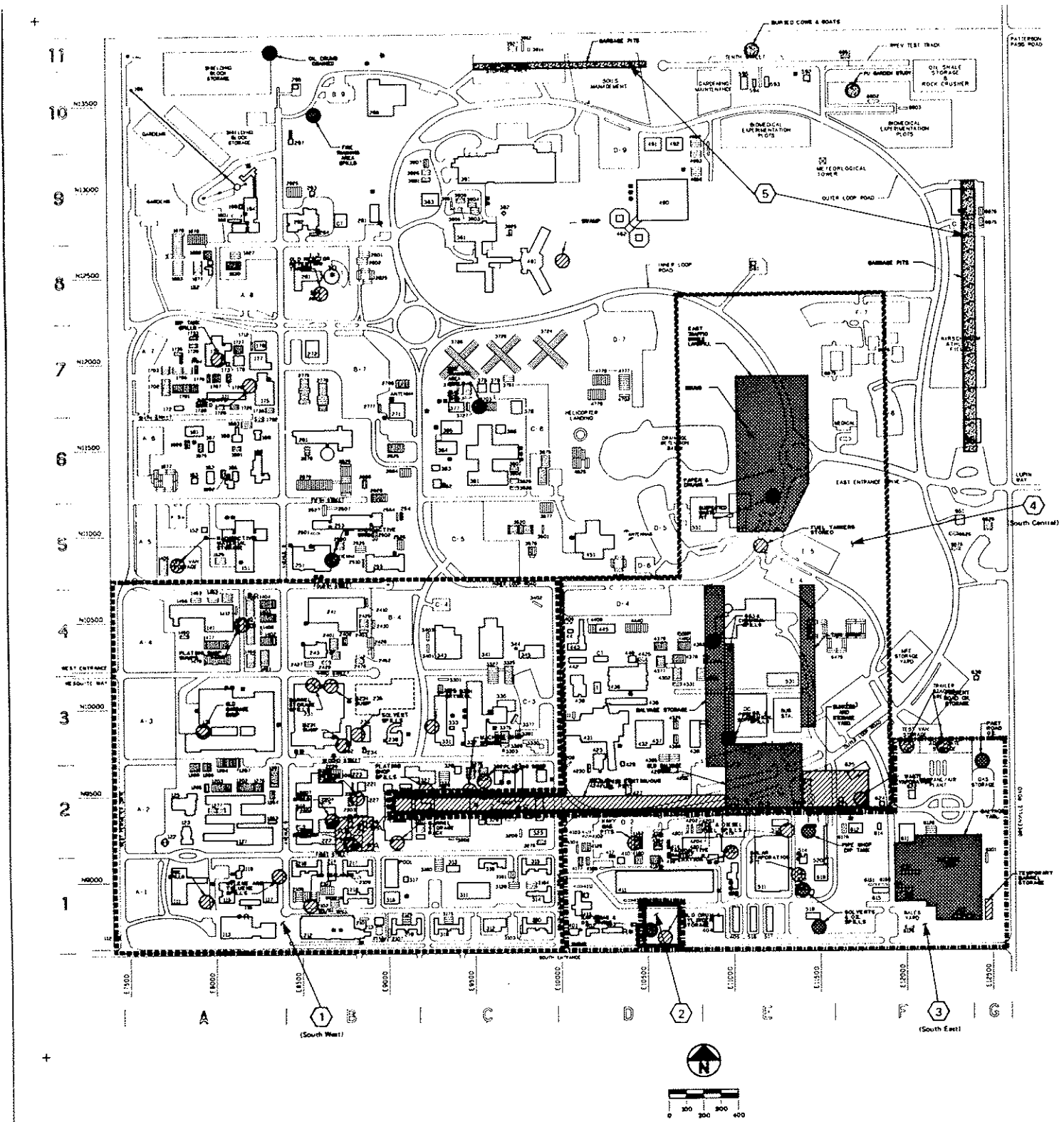


LEGEND

- VALLEY LANDS — Underlain by Holocene sediments
- UPLANDS — Underlain by the Livermore Formation
- NONWATER-BEARING ROCKS — Exposed within Ground Water Basin
- GROUND WATER BASIN BOUNDARY
- SUBBASIN BOUNDARY
- VALLEY FLOOR BOUNDARY
- SUBBASIN INTERIOR BOUNDARY
- I REGION WITHIN SUBBASIN

LOCATION OF SUBBASINS AND PHYSIOGRAPHIC FEATURES

LIVERMORE VALLEY



L L N L
SITE MAP
University of California / Livermore
Lawrence Livermore National Laboratory
PLANT ENGINEERING
SUSPECTED CONTAMINATED AREAS
APRIL 1985
E.SIDSON 4-25-85
D.AHEB 4-25-85
1" = 200' EPD-504
RELEASE FOR CONSTRUCTION
1

ATTACHMENT 2